

# DD-10/DD-10S

## DISPLAY

### OPERATOR

#### MANUAL



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## Revision to Manual

Revision Number	Description of Change	Date
00	New Release	12/6/2010

# DD10 DISPLAY OPERATOR MANUAL



## Display Operator Manual

Here you will find instructions on how to setup display appearance, navigate through the display screens, use the diagnostics as a troubleshooting tool, understand what each icon mean, and review all fault messages in detail.

Section 1.....	Screen Navigation
Section 2.....	Diagnostics
Section 3.....	Screen Setup
Section 4.....	Icons
Section 5.....	Fault Messages

## Section 1

### Section 1

### Screen Navigation

When you first power up the display, the Astec Underground Logo appears (screen 1).



After 3 seconds, this screen times out and goes to the Main screen

Main Screen (screen 2).



Main screen displays

1. Fuel Level
2. Coolant Temperature
3. Engine RPM
4. System Voltage

**Screen Options**



Goes to PRESSURE SETTING screen (screen 3)



Goes to FAULT MESSAGE screen (screen 6)

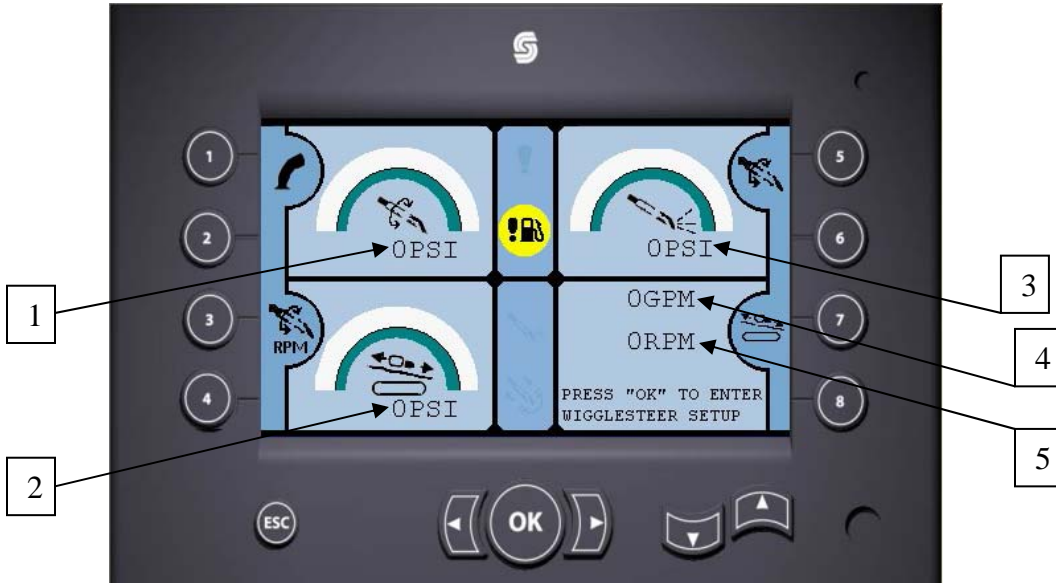


Goes to DIAGNOSTIC screens (screen 7)



Goes to Astec Underground Logo (screen1)

Pressure Screen (screen 3)



Pressure screen displays

- 1. Rotary Pressure
- 2. Carriage Pressure
- 3. Mud Pressure
- 4. Mud GPM
- 5. Rotary RPM

**Screen Options**



Goes to FORCE SETTING screen (screen 4)



Goes to MAIN screen (screen 2)



Pulls up the JOYSTICK and ROTARY RPM adjustment

OR



window (screen 3a)



Pulls up the ROTARY PSI and CARRIAGE PSI adjustment

OR



window (screen 3b).

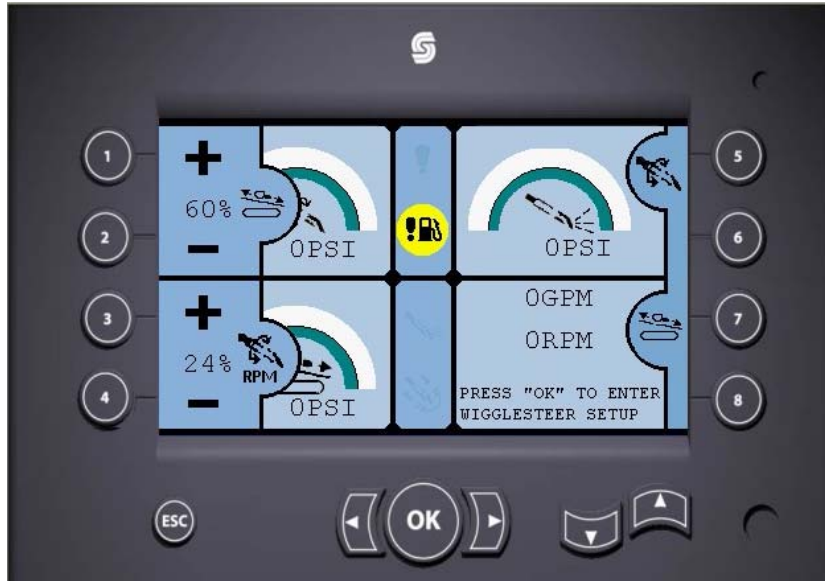


Goes to Wiggle Steer adjustment (screen 5)



Goes to Astec Underground icon (screen1)

## Rotary Adjustment Screen (screen 3a)



Allows you to adjust the Joystick Maximum Output and Rotary RPM. Window will disappear 3 seconds after last button was released. Both windows (3a and 3b) can be open at the same time.

**Screen Options**

Increases the Joystick setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Joystick setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.



AND



Switch the Joystick setting from Carriage to Rotary (or Rotary to Carriage).

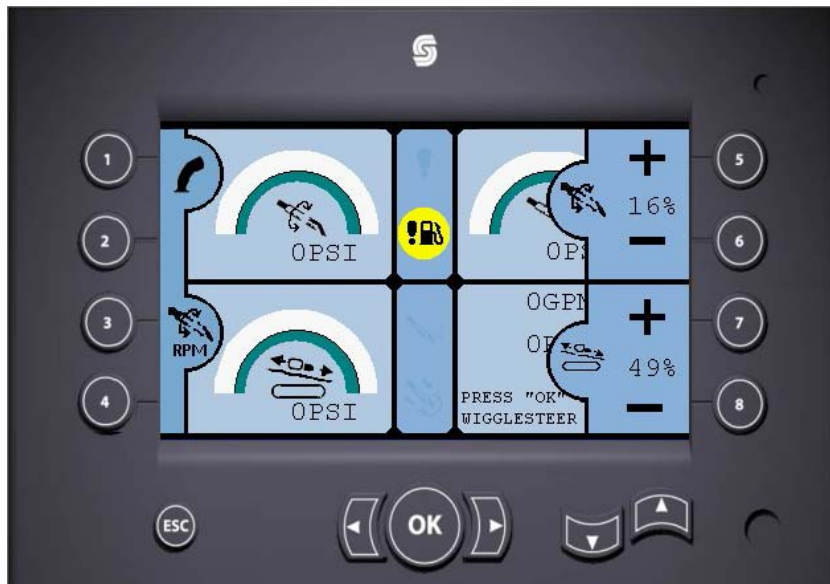


Increases the Rotary RPM setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Rotary RPM setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.

Rotary PSI and Carriage PSI screen (screen 3b)



Allows you to adjust the Rotary PSI and Carriage PSI settings. Window will disappear 3 seconds after last button was released. Both windows (3a and 3b) can be open at the same time.

### Screen Options



Increases the Rotary PSI setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Rotary PSI setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.



Increases the Carriage PSI setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Carriage PSI setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.

Force Screen (screen 4)



Pressure screen displays

1. Rotary Foot-Pounds
2. Carriage Pounds
3. Mud Pressure
4. Mud GPM
5. Rotary RPM

**Screen Options**



Goes to SETUP screen (screen 5)



Goes to PRESSURE SETTING screen (screen 3)



Pulls up the ROTARY RPM adjustment window (screen 4a)



Pulls up the ROTARY PSI and CARRIAGE PSI adjustment

OR



window (screen 4b).

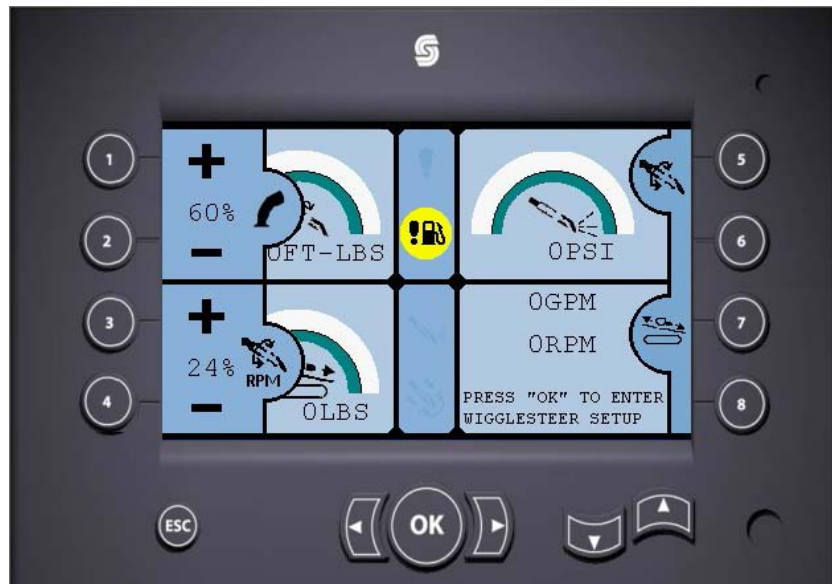


Goes to Wiggle Steer adjustment (screen 5)



Goes to Astec Underground Logo (screen1)

## Rotary Adjustment Screen (screen 4a)



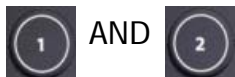
Allows you to adjust the Joystick Maximum Output and Rotary RPM. Window will disappear 3 seconds after last button was released. Both windows (4a and 4b) can be open at the same time.

**Screen Options**

Increases the Joystick setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Joystick setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.



AND Switch the Joystick setting from Carriage to Rotary (or Rotary to Carriage).

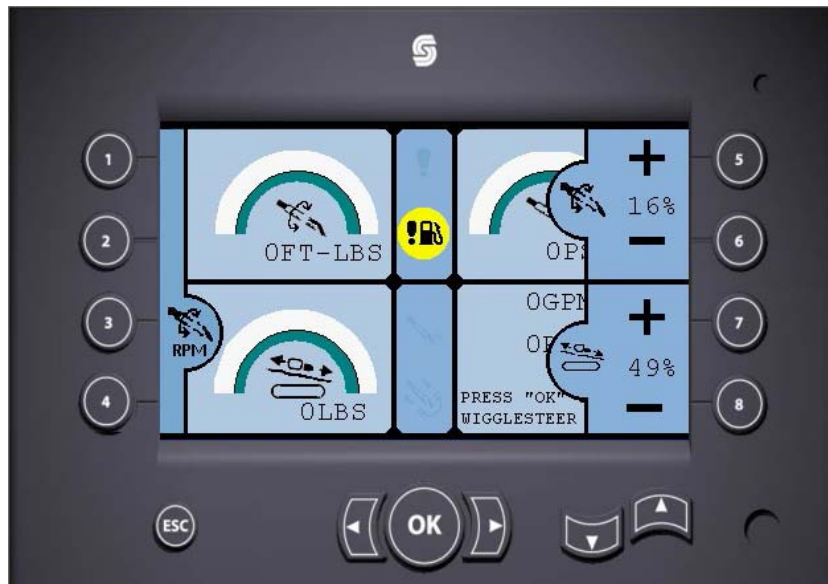


Increases the Rotary RPM setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Rotary RPM setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.

Rotary PSI and Carriage PSI screen (screen 4b)



Allows you to adjust the Rotary PSI and Carriage PSI settings. Window will disappear 3 seconds after last button was released. Both windows (4a and 4b) can be open at the same time.

### Screen Options



Increases the Rotary PSI setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.



Decreases the Rotary PSI setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.



Increases the Carriage PSI setting. For the first 3 seconds that the button is pressed, the value increases slowly. If pressed longer, the value will increase at a faster pace.







Decreases the Carriage PSI setting. For the first 3 seconds that the button is pressed, the value decreases slowly. If pressed longer, the value will decrease at a faster pace.

Wiggle Steer adjustment Screen (screen 5)



**Screen Options**

-  Goes to Wiggle Steer setup (screen 6)
-  Activates Wiggle Steer
-  De-activates Wiggle Steer
-  Goes to Pressure Screen (screen 3)

Wiggle Steer Setup Screen (screen 6)



**Screen Options**



Scrolls the highlighted bar up



Scrolls the highlighted bar down



Selects whichever option is highlighted

Option 1 – Count reset (screen 6a). A red message will automatically appear when the 'OK' button is selected, indicating that the count is 'reset'. The message is active for approximately one second before defaulting back to Wiggle Steer Setup screen (screen 6). Pressing the 'OK' button will again 'reset' the count.



Option 2 – Count adjusting (screen 6b).



**Screen Options**



Increments the desired wiggle rotations up



Increments the desired wiggle rotations down



Goes to Wiggle Steer Setup (screen 6)

Option 3 – Save and Exit.

Goes to Wiggle Steer adjustment (screen 5).

Setup Screen (screen 7)



Setup screen displays

1. Machine Information
2. General System Help
3. Engine Error Codes
4. Diagnose and Update System

### **Screen Options**



Goes to MACHINE INFORMATION screen (screen 7a)



Goes to GENERAL SYSTEM HELP screen (screen 7b)

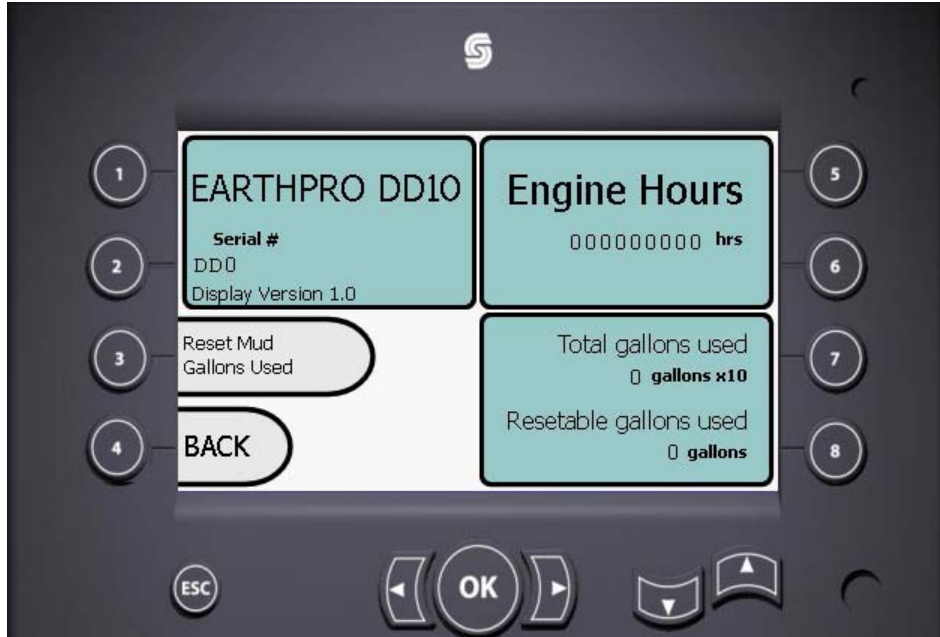


Goes to ENGINE ERROR CODES screen (screen 7c)



Goes to DIAGNOSE AND UPDATE SYSTEM screen  
(screen 7d)

Machine Information (screen 7a)



**Screen Options**

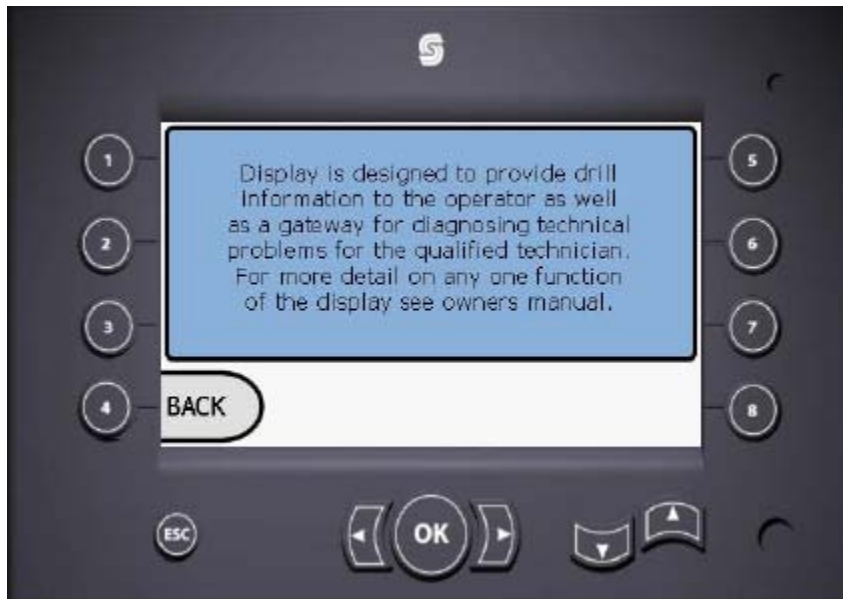


Resets Mud Gallons Used



Goes to SETUP screen (screen 7)

General System Help (screen 7b)



**Screen Options**



Goes to SETUP screen (screen 7)

Engine Error Codes (screen 7c)



Displays Engine Error Codes that are being sent from the Engine (J1939).

**Screen Options**



Scrolls through active faults on screen



Goes to SETUP screen (screen 7)

Diagnose and Update System (screen 7d)



Not to be used!

**Screen Options**



Goes to SETUP screen (screen 7)

Fault Message Screen (screen 8)



Will show active faults that were detected by the software. See Section 4 for details on fault messages.

### **Screen Options**



Goes to MAIN screen (screen 2)



Goes to SETUP screen (screen 7)



Scrolls through active faults on screen



Clears active errors from screen. Pressing 'OK' clears one error at a time. If 'OK' is pressed and error does not clear, the error is still active in the system.



Goes to MAIN screen (screen 2)

## Section 2

### Section 2

### Diagnostics

#### DIAGNOSTIC SCREENS

**NOTE: The only way to see these screens is to go to the MAIN screen (screen 2) and press 1 and 5 at the same time!**

Drill Diagnostic – 1 (screen 9)



**Seat Switch** – defines whether the seat switch is active, 1 = seat switch active.

**Setup Switch** – defines whether the setup switch is active, 1 = Setup mode and 0 = drill mode.

**Rod Loader Switch** – defines whether the loader arms are up or down, 1 = arms down.

**Cam Back Switch** – defines whether the cam is back out of the way of the carriage, 1 = cam back.

**Carriage Back** – defines whether the carriage is on the carriage back limit switch, 1 = carriage back.

**Carriage Slowdown** – defines whether the carriage is on the carriage slowdown limit switch, 1 = carriage on slowdown switch.

**Carriage Two Speed Switch** – defines whether the carriage is in high or low speed, 1 = hi speed.

**Rotary Joystick** – shows the actual rotary joystick percent. The signal is from -100% (makeup) to 100% (breakout) with 0% neutral.

**Carriage Joystick** – shows the actual carriage joystick percent. The signal is from -100% (pullback) to 100% (thrust) with 0% neutral.

**MakeUp** – defines the actual current (mA) being sent to the MakeUp solenoid.

**BreakOut** – defines the actual current (mA) being sent to the BreakOut solenoid.

**Thrust** - defines the actual current (mA) being sent to the Thrust solenoid.

**Pullback** - defines the actual current (mA) being sent to the Pullback solenoid.

**Carriage Two Speed Out** – defines whether the carriage two speed output is being activated, 1 = hi speed.

### **Screen Options**



Goes to DRILL DIAGNOSTICS - 2 screen (screen 10)



Goes to MISC DIAGNOSTICS (screen 14)



Goes to MAIN screen (screen 2)

## Drill Diagnostics – 2 (screen 10)



**Fast Reset Switch** – defines whether the fast reset input switch is active, 1 = fast reset active.

**Gate Open Switch** – defines whether the Wireline Station gate is opened, 1 = gate open.

**Gate Closed Switch** – defines whether the Wireline Station gate is closed, 1 = Gate closed.

**Carriage Transducer** – shows the actual voltage (mV) from the transducer.  
Range is from 480mV to 4500mV

**Rotary Transducer** – shows the actual voltage (mV) from the transducer.  
Range is from 480mV to 4500mV

**Mud Transducer** – shows the actual voltage (mV) from the transducer.  
Range is from 480mV to 4500mV

**Thrust PSI Control** – defines the actual current (mA) being sent to the thrust PSI control solenoid.

**Pullback PSI Control** – defines the actual current (mA) being sent to the pullback PSI control solenoid.

**Rotary PSI Control** - defines the actual current (mA) being sent to the rotary PSI control solenoid.

**Rotary RPM** - defines the actual current (mA) being sent to the rotary RPM solenoid. There are two solenoids in parallel with one another, so you must divide the total current by two to determine the current through each solenoid.

**Fast Reset Out** – defines whether the fast reset output is being activated.

**Carriage Full Back Out** – defines whether the carriage full back output is being activated. Must be '1' to allow rod loader arms to move in.

### **Screen Options**



Goes to DRILL DIAGNOSTICS - 3 (screen 11)



Goes to DRILL DIAGNOSTICS - 1 (screen 9)



Goes to MAIN screen (screen 2)

Drill Diagnostics – 3 (screen 11)



**Clamps** – defines whether the Fixed clamp or Rotary clamp switch is active, 1 = one of clamp switches active.

**TJC Switch** – defines whether the TJC input switch is active, 1 = TJC active.

**Set Switch** – defines whether the set switch is active, 1 = set switch active.

**Resume Switch** – defines whether the resume switch is active, 1 = resume switch active.

**TJC Out** – defines whether the TJC output is being activated.

### Screen Options



Goes to TRACK DIAGNOSTICS (screen 12)



Goes to DRILL DIAGNOSTICS - 2 (screen 10)



Goes to MAIN screen (screen 2)

Track Diagnostics (screen 12)



**Seat Switch** – defines whether the seat switch is active, 1 = seat switch active.

**Setup Switch** – defines whether the setup switch is active, 1 – Setup mode and 0 = drill mode.

**Operator Present Left** – defines whether the operator has the enable button selected on the left track joystick, 1 = left enable.

**Operator Present Right** – defines whether the operator has the enable button selected on the right track joystick, 1 = right enable.

**Lo Speed Select** – defines whether track is in low speed, 1 = low speed.

**Hi Speed Select** – defines whether track is in high speed, 1 = high speed.

**Left Track Joystick** – shows the actual left track joystick percent. The signal is from -100% (reverse) to 100% (forward) with 0% neutral.

**Right Track Joystick** – shows the actual right track joystick percent. The signal is from -100% (reverse) to 100% (forward) with 0% neutral.

**Left Track Fwd** – defines the actual current (mA) being sent to the left track forward solenoid.

**Left Track Rev** – defines the actual current (mA) being sent to the left track reverse solenoid.

**Right Track Fwd** – defines the actual current (mA) being sent to the right track forward solenoid.

**Right Track Rev** – defines the actual current (mA) being sent to the right track reverse solenoid.

### **Screen Options**



Goes to MUD DIAGNOSTICS screen (screen 13)



Goes to DRILL DIAGNOSTICS - 3 (screen 11)



Goes to MAIN screen (screen 2)

Mud Diagnostics (screen 13)



**Seat Switch** – defines whether the seat switch is active, 1 = seat switch active.

**Setup Switch** – defines whether the setup switch is active, 1 – Setup mode and 0 = drill mode.

**Mud On Switch** – defines whether the mud has been enabled, 1 = mud on.

**Mud Max Switch** – defines whether the mud max switch is active, 1 = mud max on.

**Flow Increase** – defines whether flow increase is active, 1 = flow increase.

**Flow Decrease** – defines whether flow decrease is active, 1 = flow decrease.

**Blowdown Open** – defines whether the blowdown open output is active.

**Blowdown Closed** – defines whether the blowdown closed output is active.

**Shutdown Open** – defines whether the shutdown open output is active.

**Shutdown Closed** – defines whether the shutdown closed output is active.

**Liner Wash Out** – defines whether the liner wash output is active.

**Mud Out** – defines the actual current (mA) being sent to the mud pump solenoid.

**Mud Percent** – defines the percent of mud output that is being sent (0 – 100%).

**Mud Proximity Switch** – defines the actual frequency (Hz) from the proximity switch. As the mud flow increases, the frequency should also increase and as the mud flow decreases, the frequency should decrease.

### **Screen Options**



Goes to MISC DIAGNOSTICS screen (screen 14)



Goes to TRACK DIAGNOSTICS - 1 (screen 12)



Goes to MAIN screen (screen 2)

Misc Diagnostics (screen 14)



**Air Increase** – defines whether air increase switch is active, 1 = air increase.

**Air Decrease** – defines whether air decrease switch is active, 1 = air decrease.

**Air Hammer Feedback** – defines whether the air system is on, 1 = air on

**Air Increase Out** – defines whether air increase output is active.

**Air Decrease Out** – defines whether air decrease output is active.

**Fuel Level Sender** – shows the resistance (ohms) from the Fuel Level Sender.

**Engine Speed** – shows engine speed from the Engine CAN-Bus.

**Engine Per Load** – shows the percent load from the Engine CAN-Bus.

**Engine** – shows the voltage from the Engine CAN-Bus.

**Drill Module** – shows the voltage into the drill module.

**Output Expander** – shows the voltage into the output expander.

## Screen Options



Goes to DRILL DIAGNOSTICS - 1 screen (screen 9)



Goes to MUD DIAGNOSTICS (screen 13)





Goes to MAIN screen (screen 2)

## Section 3

### Section 3

### Screen Setup

Used to adjust the screen brightness and enable key backlight.

Press  +  at any time to adjust the units of pressure, force, and torque or screen brightness and/or turn off and on the key backlight.

The Key Backlight lights up the buttons to be visible in the dark conditions. The following SCREEN SETUP screen will appear.

SCREEN SETUP (screen 15)



### Screen Options



Scrolls the highlighted bar up



Scrolls the highlighted bar down



Selects whichever option you have highlighted

Option 1 – Units of pressure, force, and torque (screen 15a)



**Screen Options**



Selects SAE units of measure



Selects metric units of measure

Option 1 - Screen Brightness (screen 15b)



**Screen Options**



Decreases the screen brightness



Increases the screen brightness



Exits screen

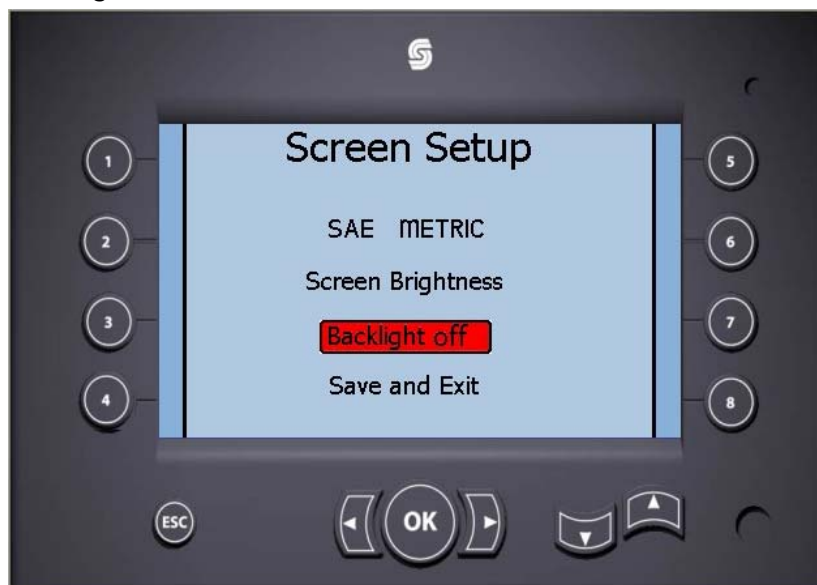
Option 2 - Key Backlight (screen 15c or screen 15d). Green or Red message will automatically appear when the 'OK' button is selected telling you if the feature is 'on' or 'off'. Message will be active for roughly 1 second before defaulting back to SCREEN SETUP screen (screen15). If you press the 'OK' button again, the opposite feature will appear.

Backlight On (screen 15c)



OR

Backlight Off (screen 15d)



**Screen Options**



Scrolls the highlighted bar up



Scrolls the highlighted bar down



Selects whichever option you have highlighted

Option 3 - Save and Exit

Takes you make to MAIN screen (screen 2)

# Section 4

## Section 4

## Icons

Icons



Low Fuel



Low Fuel Pressure



Low Oil Pressure



Auto Drill Active



Mud On



Mud Error



Low Battery



Coolant Error



Fault has been detected by software. Go to FAULT MESSAGE screen (screen 8)



Fault has been sent from engine. Go to ENGINE ERROR CODE screen (screen 7c)



Water Temp Warning

## Section 5

### Section 5

### Fault Messages

---

**Error**            **DRILL JOYSTICK OFFLINE**

**Cause**            No CAN communication with drill joystick

**Effect**            Track functions are disabled

**Remedy**            Check CAN wiring  
Check power to drill joysticks

---

**Error**            **PROPEL JOYSTICK OFFLINE**

**Cause**            No CAN communication with propel joystick

**Effect**            Drill functions are disabled

**Remedy**            Check CAN wiring  
Check power to propel joysticks

---

**Error**            **PROPEL START CONDITION**

**Cause**            Propel joystick is not in neutral when power was applied to system

**Effect**            Track functions are disabled

**Remedy**            Make sure joysticks are in neutral  
Check wiring

---

**Error**            **DRILL START CONDITION**

**Cause**            Drill joystick is not in neutral when power was applied to system

**Effect**            Drill functions are disabled

**Remedy**            Make sure joystick is in neutral  
Check wiring

---

<b>Error</b>	<b>RIGHT TRACK FORWARD SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	Forward travel is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from right track forward solenoid

---

<b>Error</b>	<b>RIGHT TRACK REVERSE SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	Reverse travel is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from right track reverse solenoid

---

<b>Error</b>	<b>LEFT TRACK FORWARD SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	Forward travel is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from left track forward solenoid

---

<b>Error</b>	<b>LEFT TRACK REVERSE SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	Reverse travel is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from left track reverse solenoid

---

**Error            MAKEUP SOLENOID**

**Cause**            Solenoid is open  
                      Short to power/ground  
                      ES!LOK not enabled  
                      Carriage/Rotary disable is enabled

**Effect**            MakeUp is disabled

**Remedy**           Check resistance across solenoid, check for open or short  
                      Check wiring to/from makeup solenoid

---

**Error            BREAKOUT SOLENOID**

**Cause**            Solenoid is open  
                      Short to power/ground  
                      ES!LOK not enabled  
                      Carriage/Rotary disable is enabled

**Effect**            Breakout is disabled

**Remedy**           Check resistance across solenoid, check for open or short  
                      Check wiring to/from breakout solenoid

---

**Error            THRUST SOLENOID**

**Cause**            Solenoid is open  
                      Short to power/ground  
                      ES!LOK not enabled  
                      Carriage/Rotary disable is enabled

**Effect**            Thrust is disabled

**Remedy**           Check resistance across solenoid, check for open or short  
                      Check wiring to/from thrust solenoid

---

<b>Error</b>	<b>PULLBACK SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground ES!LOK not enabled Carriage/Rotary disable is enabled
<b>Effect</b>	Pullback is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback solenoid

---

<b>Error</b>	<b>CARRIAGE JOYSTICK</b>
<b>Cause</b>	Joystick signal out of range Short to power/ground
<b>Effect</b>	Pullback is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback solenoid

---

<b>Error</b>	<b>ROTARY JOYSTICK</b>
<b>Cause</b>	Joystick signal out of range Short to power/ground
<b>Effect</b>	Pullback is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback solenoid

---

<b>Error</b>	<b>LEFT JOYSTICK</b>
<b>Cause</b>	Joystick signal out of range Short to power/ground
<b>Effect</b>	Pullback is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback solenoid

---

<b>Error</b>	<b>RIGHT JOYSTICK</b>
<b>Cause</b>	Joystick signal out of range Short to power/ground
<b>Effect</b>	Pullback is disabled
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback solenoid

---

<b>Error</b>	<b>ROTARY PRESSURE TRANSDUCER</b>
<b>Cause</b>	Open or short to power/ground
<b>Effect</b>	Error message
<b>Remedy</b>	Check transducer Check wiring to/from transducer

---

<b>Error</b>	<b>ROTARY PRESSURE HIGH</b>
<b>Cause</b>	Rotary pressure has exceeded maximum pressure setting for more than a quarter of a second.
<b>Effect</b>	Error message
<b>Remedy</b>	Check pressure settings on display. May need to lower settings if error keeps repeating.

---

<b>Error</b>	<b>CARRIAGE PRESSURE TRANSDUCER</b>
<b>Cause</b>	Open or short to power/ground
<b>Effect</b>	Error message
<b>Remedy</b>	Check transducer Check wiring to/from transducer

---

<b>Error</b>	<b>CARRIAGE PRESSURE HIGH</b>
<b>Cause</b>	Rotary pressure has exceeded maximum pressure setting for more than a quarter of a second.
<b>Effect</b>	Error message
<b>Remedy</b>	Check pressure settings on display. May need to lower settings if error keeps repeating.

---

<b>Error</b>	<b>MUD PRESSURE TRANSDUCER</b>
<b>Cause</b>	Open or short to power/ground
<b>Effect</b>	Error message
<b>Remedy</b>	Check transducer Check wiring to/from transducer

---

<b>Error</b>	<b>MUD PRESSURE HIGH</b>
<b>Cause</b>	Rotary pressure has exceeded maximum pressure setting for more than a quarter of a second.
<b>Effect</b>	Error message
<b>Remedy</b>	Check pressure settings on display. May need to lower settings if error keeps repeating.

---

<b>Error</b>	<b>J1939/ENGINE CAN</b>
<b>Cause</b>	No Engine CAN communication
<b>Effect</b>	No load limiting control while drilling
<b>Remedy</b>	Check CAN wiring

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<b>Error</b>	<b>MUD PROXIMITY SWITCH</b>
<b>Cause</b>	We have flow and engine RPM is greater than 800 RPM with no feedback signal from proximity switch.
<b>Effect</b>	Error message
<b>Remedy</b>	Check proximity switch sensor. Check wiring.

---

<b>Error</b>	<b>MUD PUMP SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	No mud pump
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from mud pump solenoid

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<b>Error</b>	<b>ROTARY PSI CONTROL SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	No Rotary PSI control adjustments
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from rotary PSI control solenoid

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<b>Error</b>	<b>ROTARY DISPLACEMENT CONTROL SOLENOID</b>
<b>Cause</b>	Signal is open or shorted to ground/power
<b>Effect</b>	No Rotary Displacement adjustments
<b>Remedy</b>	Check wiring to/from rotary displacement control solenoids. There are two solenoids wired in parallel. If one solenoid goes bad, system will still work but with limited speed.

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<b>Error</b>	<b>THRUST PSI CONTROL SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	No Thrust PSI control adjustments
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from thrust PSI control solenoid

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<b>Error</b>	<b>PULLBACK PSI CONTROL SOLENOID</b>
<b>Cause</b>	Solenoid is open Short to power/ground
<b>Effect</b>	No Pullback PSI control adjustments
<b>Remedy</b>	Check resistance across solenoid, check for open or short Check wiring to/from pullback PSI control solenoid

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<b>Error</b>	<b>WIRELINE GATE OPEN</b>
<b>Cause</b>	Wireline station gate is open Short to power/ground on gate switch wires
<b>Effect</b>	Carriage and Rotary speeds are reduced
<b>Remedy</b>	Check operation of Wireline Station gate switch Check wiring to/from Wireline Station gate

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